Two Cases of Meningococcal Sepsis Caused By Neisseria Meningitidis Serogroup B

Meningococcal Sepsi

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Abstract

Thirteen serogroups of bacterium Neisseria meningitidis (N. meningitidis) have been identified, but 5 of them - A, B, C, W-135 and Y - are responsible for majority of the infections worldwide. Serogroup B meningococcus is uncommon in Bulgaria. In 2014 two cases of meningococcal sepsis caused by N. meningitidis serogroup B were diagnosed and treated in the Clinic of Infectious Diseases of University Hospital of Stara Zagora, Bulgaria. They were 10-months old female and 1-year old male. The diagnosis was based on the clinical, epidemiological, laboratorial, microbiological and molecular-genetic analysis. Both cases presented with a sudden oncet of fever, marked asthenia, refusing feeds and hemorrhagic-necrotic skin rash. In the first case the disease evolved to meningococcal sepsis with meningitis with a favorable outcome. The second case rapidly developed fulminant meningococcal sepsis without meningitis with a lethal outcome. In both cases N. meningitidis serogroup B as etiological agent was confirmed.

Keywords

Meningococcal Sepsis; Neisseria Meningitidis Serogroup B; Suckling

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Introduction: Majority of cases of Meningococcal disease occur during the winter and early spring. The rate of this anthroponosis is high among suckling, infants, adolescents and young adults [1]. Neisseria meningitidis (N. meningitidis) is a Gram-negative aerobic diplococcus divided into 13 serogroups. Serogroups A, B, C and W-135 are responsible for over 99 percent of cases. According to the data of WHO approximately 20 000-80 000 cases of Meningococcal disease serogroup B occur annually in the world with case-fatality rate about 10 percent despite treatment and optimal medical care [2]. Around 10-20 % of cases N. meningitidis gain access to the blood stream causing meningococcemia. [3].

The aim of this study is to evaluate the clinical progress of meningococcal sepsis caused by rare serogroup B meningococcus in two suckling.

Materials and methods: In a period from 17.10 to 11.12.2014 two cases of Meningococcal sepsis have been treated in the Clinic of Infectious Diseases, University Hospital of Stara Zagora. They are a 10 months-old female and a 12-months-old male. Both children are from Romani ethnic community in Stara Zagora region. Clinical, epidemiological, laboratorial, microbiological and molecular-genetic tests were made. The pathological data obtained in the second case.

Case Report 1

A 10 months-old female was presented to the Emergency Center, University Hospital of Stara Zagora with a 7 day history of fever - 38ºC and poor feeding. One day prior to admission the child began vomiting and appeared inactive. Some hours later a rash appeared: first on the trunk, subsequently involved the whole body. The child was born of third uncomplicated pregnancy, incompletely vaccinated. The patient was admitted in a generally bad condition with fever - 38 ºC, drowsy and irritable. When examined the patient presented sore throat, pale skin with polygonal hemorrhagic-necrotic rash 2-3 millimeters in diameter localized on the buttocks, thighs and forearms. The cardiorespiratory examination was unremarkable. The neurological examination revealed brisk tendon and periosteal reflexes with enlarged reflexogen tones, meningeal irritation – severe neck stiffness, and positive Brudzinski's neck sign. Cranial nerve examination showed no lesions. Blood tests showed leukocytosis and moderate anemia. On the day of admission the level of prothrombin time was low (Table 1). Three lumbar punctures were performed. On admission the cerebrospinal fluid (CSF) changes were consisted with those of bacterial meningitis i.e. turbid appearance with high pressure, high cellularity, low glucose, high level of protein (Table 2). CSF cultures were positive for N. meningitidis serogroup B twice. The diagnosis was confirmed by PCR test. On the 7-th hospital day fever, skin rash and signs of meningeal injury completely disappeared. The patient was treated with appropriate antibiotics and supportive therapy. The child fully recovered after a hospital stay of 13 days.

Case Report 2

A previously healthy 1-year old male was presented to the Emergency Center, University Hospital of Stara Zagora with one day history of fever, cough, coryza, vomiting and diarrhea.

Table 1. Laboratory findings in patients with Meningococcal Sepsis

Variable (unit)	Reference range	Patient 1			Patient 2
		11 Dec 2014	13 Dec 2014	22 Dec 2014	17 Oct 2014
Hemoglobin (g/L)	107-131	89.4	90	96	109
Erythrocyte (x1012/L)	4.0-5.2	4.01	4.33	4.69	4.87
Hematocrit (l/L)	0.33-0.45	0.27	0.27	0.31	0.35
White Blood Cells (x109/L)	6,0-17.5	22.6	21.1	14.2	2.7
Prothrombin Time (%)	70-110	19	120.4	117.3	13
Fibrinogen (g/L)	2.0-4.5	3.84	6.87	2.58	0.5
Urea (mmol/L)	3,4-8,4	8.2	4.7	ND	7.3
Differential Count of WBC					
• Neutrophils (%)	22-45	51	54	25	3
• Bands/Stabs (%)	–	26	16	2	5
• Eosinophils (%)	2.5-6.8	3	ND	3	1
• Basophils (%)	0.0-1.0	ND	ND	ND	ND
• Monocytes (%)	4.7-8.0	6	5	11	3
• Lymphocytes (%)	35-74	14	25	59	88

Note: WBC – White Blood Cells; ND – no data available;

Table 2. CSF data in patients with Meningococcal Sepsis

Variable (unit)	Reference range	Patient 1			Patient 2
		11 Dec 2014	13 Dec 2014	19 Dec 2014	17 Oct 2014
Protein (g/L)	0.15-0.45	2.1	1.7	0.37	1.19
White Blood Cells (x106/L)	15-20	25 600	6 400	1	34
Erythrocyte (x1012/L)	4.0-5.2	170	38	17	21
Glucose (mmol/L)	2.2-4.4	0.02	4.95	2.99	2.09
Pandy's Test	Negative	+++	++	–	+
CSF Culture	–	N. Meningitidis Group B	N. Meningitidis Group B	No Growth	No Growth

Note: CSF – Cerebrospinal Fluid;

Fast breathing with moaning and pallor occurred in hours before hospitalization. The child was born on third uncomplicated pregnancy. He was also incompletely vaccinated. The members of the family suffered of respiratory infection a week before the child's hospitalization. On admission the patient was somnolent with Glasgow come score ≤ 8. There was a clinical manifestation of septic shock – marked pallor on the face and trunk with hemorrhagic rash widely distributed over the trunk and extremities, cold and cyanotic lips and extremities. The temperature was 36,2°C, the respiration rate was 60-70 / minute, the pulse rate was 140-160 / minute. The physical examination found sore throat, liver and spleen enlargement. All tendon and periosteal reflexes were decreased. Signs of meningeal injury were absent.

Laboratory findings showed leucopenia and coagulation disorders. Lumbar puncture was performed and CSF tests estimated pleocytosis with proteinorachia. CSF cultures were negative for N. meningitidis group B. Blood test was positive for N. meningitidis group B by PCR method.

In a few hours after the admission the condition was deteriorate, Glasgow come score ≤ 3. The respiratory symptoms get worsen and the respiratory failure and cardiac arrest have been

developed. A postmortem lividest rash appeared on the extremities and abdomen (Figure 1a). Despite the adequate reanimation procedures the patient died. The autopsy was performed and the pathological exam found bilateral adrenal apoplexy (Figure 1b).

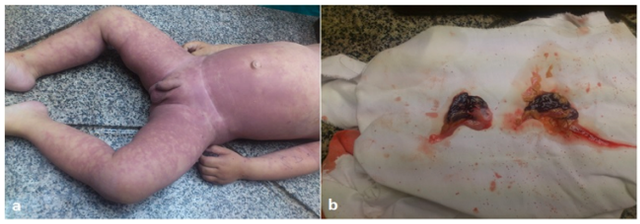

Figure 1. Post-mortem type of lividity in the low extremities and abdomen (a), Bilateral adrenal apoplexy (b).

Discussion

Meningococcal sepsis account for 5 to 20 % of Meningococcal disease. Blood cultures are positive for N. meningitidis in over 75% [4].

Case 1had the typical clinical presentation of Meningococcal sepsis with meningitis. The patient didn't develop any complications and was discharged recovered. Case 2 developed the worst clinical form of Meningococcal disease - Waterhouse-Friderichsen syndrome. Signs of meningitis didn't occur. A fulminant course of septic shock, disseminated intravascular coagulation, multi-organ failure and a lethal outcome occurred in less than 24 hours. Both children were eutrophic previously healthy and without any underlying diseases. They were brought up in comparatively comfortable living conditions. Their immunization history was not appropriate for the age, because of their parents' low education. A respiratory infection affected the family members of case 2, most probably caused by N. meningitidis. Due to the lack of collaboration with the family the diagnostic tests were not performed.

The clinical presentation of Meningococcal sepsis with central nervous system's involvement is typical, but sometimes the classic symptoms may be absent or difficult to notice. Widespread petechial rash is an early typical finding [5]. The reported case 1 illustrates such a clinical presentation with a favorable outcome. The prognosis of Meningococcal meningitis is relatively good if the patient is not comatose. Poor prognostic findings are thrombocytopenia, coagulation disorders, moderate anemia, unconsciousness and seizures [6]. The etiological diagnosis is based on the good standard for Gram stain, CSF and blood cultures. The application of new diagnostic methods as PCR is substantially increased in routine practice. They can be used as for the detection of bacterial and viral pathogens [8]. It is easy to mistake the early signs and symptoms of Meningococcal disease, especially they are presented as acute respiratory infection, septic shock and lethal outcome within 24 hours. The survivors suffer from a number of significant sequelae [7].

Multivalent polysaccharide vaccines against serogroups A, C, Y, and W are licensed and available worldwide. Development of a vaccine against serogroup B meningococcus has been problematic because of its morphologic diversity. Despite of this recently it is in being in some countries [9].

The present cases are typical clinical manifestation of Meningococcal infection. The diagnosis was suspected on the admission and the appropriate diagnostic and therapeutic methods were applied. The outcome of case 1 was favorable as other reported cases of Meningococcal meningitis. The result of Waterhouse-Friderichsen syndrome, whose developed in case 2 was fatal, the child died in less than two days after the onset of the symptoms.

Competing interests

The authors declare that they have no competing interests.

References

1. Stephens DS, Greenwood B, Brandtzaeg P. Epidemic meningitis, meningococcaemia, and Neisseria meningitidis. Lancet 2007; 369(9580): 2196-210.
2. World Health Organization (WHO). Meningococcal meningitis (Fact Sheet № 141, Updated November 2015).
3. Tunkel AR, van de Beek D, Scheld WM. Acute Meningitis. In: Bennett JE, Dolin R, Blaser MJ, editors. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 8th ed. Philadelphia, USA: Elsevier Saunders; 2015. p. 1097-137.
4. Chin RFM, Neville BGR, Scott RC. Meningitis is a common cause of convulsive status epilepticus with fever. Arch Dis Child 2005; 90(1): 66-9.
5. Mandal S, Wu HM, MacNeil JR, Machesky K, Garcia J, Plikaytis BD, et al. Prolonged university outbreak of meningococcal disease associated with a serogroup B strain rarely seen in the United States. Clin Infect Dis 2013; 57(3): 344-8.
6. van de Beek D, de Gans J, Spanjaard L, Weisfelt M, Reitsma JB, Vermeulen M. Clinical features and prognostic factors in adults with bacterial meningitis. N Engl J Med 2004; 351(18): 1849-59.
7. VanDemark M. Acute bacterial meningitis: current review and treatment update. Crit Care Nurs Clin North Am 2013; 25(3): 351-61.
8. Saravolatz LD, Manzor O, VanderVelde N, Pawlak J, Belian B. Broad-range bacterial polymerase chain reaction for early detection of bacterial meningitis. Clin Infect Dis 2003; 36(1): 40-5.
9. Hietalahti J, Meri S New vaccines against group B meningococcal diseases. Duodecim. 2015;131(6):525-32.

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